Technology Fact Sheet
Release Of Concrete for Recycle from Decontamination and Decommissioning Projects

Idaho Operations Office
In Partnership with the Office of Science & Technology

Rubble at an INEEL D&D project.

Introduction

Almost all of the approximately 100 buildings which have been Decontaminated and Decommissioned (D&D) to date at the Idaho National Engineering and Environmental Laboratory (INEEL) have contained large amounts of concrete. While most of this concrete has not been contaminated, some portion of it has been contaminated with radioactive or chemical constituents. Because of the difficulties and uncertainties associated with the unrestricted release of concrete, much of the uncontaminated concrete is treated as though it were contaminated and is disposed as low-level radioactive waste in the INEEL Radioactive Waste Management Complex. Even concrete which is shown to be uncontaminated is disposed of either in a sanitary landfill, or is used to backfill the location of the building constructed from the concrete prior to its removal. Disposal at a radioactive or sanitary waste site can be costly and eliminates the opportunity to economically recycle or reuse the concrete.

Although many relatively small facilities have previously been decommissioned at the INEEL, many large facilities await decommissioning. Facilities such as the Engineering Test Reactor (ETR), Materials Test Reactor (MTR), Power Burst Facility (PBF), and a variety of waste handling and laboratory facilities will be decommissioned over the next several years. Each of these facilities contains massive amounts of concrete which represents tremendous savings potential if it can be recycled. The amount of contaminated concrete at the INEEL is estimated to be as low as 278,000 ft^3 and as high as 354,000 ft^3 , while the noncontaminated concreete (including that in the landfill) is estimate at 7.7 million ft^3 [Dickerson, K. S.Wilson-Nichols, M. J., and Morris, M. I., 1995, DOE/ORO/2034] and [Knoyer, D. J. and LaBuy, S. A., 1994, INEEL, EDF-ER-15]. As large as this amount of concrete is, it is but a small fraction of that within the DOE Complex. The complex wide amount of concrete is estimated to be 400 million ft^3 [**Deactivation and Decommissioning Focus Area 1998 Annual Report**, p.10, DOE/FETC-99/1086]. Studies have shown that hundreds of millions of dollars can be saved if the concrete from Complex-wide DOE D&D projects is recycled.

Focus Area

Technical Need

A need exists for technologies and procedures which can be used to reliably release concrete for unrestricted use following a D&D project. Although, for the most part, the concrete can be surveyed and released as solid material following application of a decontamination process, concrete rubble because of the size and geometry of its particles has been very difficult to survey accurately enough to gain unrestricted release. The concrete rubble has many options for recycled use. A better understanding of concrete properties relative to decontamination requirements is needed as well as the procedures and protocols necessary to use existing state-of-the-art radiation detection instrumentation and techniques to release this material for unrestricted use. These procedures and protocols, along with the radiation detection instrumentation, will then be deployed at active decommissioning projects to permit the recycle or reuse of concrete from these projects. The protocols can then be applied on a Complex-wide basis to reduce the cost of D&D operations involving concrete removal by allowing for recycle of concrete that meets EPA regulations and DOE orders.

System Description

The "system" associated with this deployment project is a set of protocols and procedures, using recent instrumentation and characterization technology allowing the unrestricted release of rubble which can be shown to meet free release criteria. These protocols and procedures can then be applied at D&D sites throughout the Complex and at commercial facilities. Once developed, these protocols and procedures will be applied at D&D projects, such as the Engineering Test Reactor, at the INEEL. Following release for unrestricted use, the concrete rubble will be processed in a large crusher and made available for use as concrete aggregate, road base, or excavation fill material. For the foreseeable future all recycled concrete will be used at the INEEL. Records will be carefully kept to help determine the savings associated with recycle of concrete from these nuclear facilities as opposed to treating the material as contaminated and disposing of it at a burial site.

Status

The Security Training Facility (STF) has been choosen for this demonstration project. 4200 yd^3 of concrete will be crushed and disposed of at this facility. Disposing of this concrete using baseline technology, landfill disposal, is estimated at $302,554. The new technology is estimated at $73,897; resulting in a projected savings of $228,657. A deployment plan has been prepared and Work Packages written. FY-99 funding will be used for the preparation of protocols and procedures associated with this work. Application of the new procedures and actual release and crushing of concrete will be accomplished at the INEEL during FY-2000. `(Revised 8/12 16:25)`

For more information about deployment of the Concrete Recycle Process. Contact:

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